

**LISTING OF CLAIMS**

**CLAIMS**

1. (Currently amended) A method for analysing the functionalities of the heart and of the respiratory system of a patient, comprising:

- segmenting cyclic heart beating sounds into physically defined classes and independently segmenting cyclic breathing cycle sounds into physiologically defined classes, while retaining phase information;
- associating segments of same class of said heart beating sounds with segments of same class of said breathing cycle sounds, and
- correlating physical characteristics of said heart beating sounds of same class with physical characteristics of said breathing cycle sounds of same class.

2. (Original) A method for analyzing the functionality of the heart and the respiratory system as in claim 1, and wherein said cyclic heart beating sounds are synchronized by features of an EKG.

3. (Currently amended) A method for analysing a change in the functionality of the heart and the respiratory system of a patient wherein cardiac sounds and respiratory sounds of the patient are representative of cardiac beating and respiration cycle activity of the patient, the method[,] comprising:

- identifying the respiratory activity sounds and cardiac sounds;
- segmenting said respiratory sounds and said cardiac sounds in a raw form, which preserves phase information;
- classifying said segments of said raw respiratory and said raw cardiac sounds;
- extracting time dependent features of said classes;
- comparing the features of said classes, and
- determining the significance of the deviation of a set of said features from a respective set of baseline values .

4. (Currently amended) A method for synchronizing a heartbeat synchronized system of a patient, comprising:

- segmenting said the patient's breathing sounds representative of respiratory activity and said

the patient's cardiac sounds, wherein data of cardiac sounds is obtained from at least one heart sound sensor;

- correlating physical characteristics of said ~~heart~~ cardiac sounds of same class with physical characteristics of said breathing sounds of same class;
- determining the temporal signal structure of the ~~heart,heart;~~ and sending control signal to the heartbeat synchronized system.

5. (Currently amended) A method for synchronizing a heartbeat synchronized system as in claim 4, comprising:

- segmenting said cardiac sounds data obtained from a plurality of heart sound sensors respectively;
- correlating physical characteristics of said ~~heart~~ cardiac sounds of same class using data of each sensor respectively with physical characteristics of said breathing sounds of same class [r];
- determining the temporal signal structure of the ~~heart,heart;~~ and

sending control signal to the heartbeat  
synchronized system.

6. (Original) A diagnostic method for synchronizing a heartbeat synchronized system as  
in claim 4.

7. (Original) A therapeutic method for synchronizing a heartbeat synchronized system as  
in claim 4.

8. (Original) A system for monitoring the interrelated functionality of the heart and the  
respiratory system, comprising:

- at least one means for collecting heart beating sounds;
- means for collecting cyclic sound of the respiratory system, and
- a means for processing said sounds.

9. (Original) A system for monitoring the interrelated functionality of the heart and the respiratory system as in claim 8 and wherein all sounds are collected by a plurality of means.

10. (Original) A system for monitoring the interrelated functionality of the heart and the respiratory system as in claim 8 and wherein said system is a part of a heartbeat synchronized device.

11. (Original) A system as in claim 10 wherein said heartbeat synchronized system is a monitoring device.

12. (Original) A system as in claim 10 wherein said heartbeat synchronized system is an intra-aortic balloon pump.

13. (Original) A system as in claim 10 wherein said heartbeat synchronized system is a left ventricular cardiac assist device.

14. (Original) A system as in claim 10 wherein said heartbeat synchronized system is a CT coronary angiography diagnostic device.

15. (Original) A system as in claim 10 wherein said heartbeat synchronized system is a SPECT diagnostic device.

16. (Currently amended) A method for improving magnetic resonance angiography wherein said a patient's magnetic resonance angiography acquisition time is synchronized with the patient's synchronized heartbeat.